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Abstract

RADIATION THERMAL CRACKING (RTC) OF OIL, OIL PRODUCTS AND GASEOUS HYDROCARBONS

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The use of radiations (γ, e^-, γ - n) permits to accomplish liquid and gaseous hydrocarbon pyrolisis in the vapor phase, because the radiation eliminates the activation limit of process initiation and the temperature (which is some 200°C lower than that of common cracking processes) provides conditions for primary radical decomposition and the chain reaction development.

It is shown, that the common radiolysis of hydrocarbons becomes of value at near 250°C and when the catalysis provided in the reaction volume near 150°C.

The RTC objective is to obtain unlimited monomeric raw materials for oil chemical synthesis and polymerisation.

The RTC of various types of raw oil, oil fractions and gaseous hydrocarbons was studied.

The dependences of the desired products yield and raw materials conversion depth on dose rate, time of presence in the reaction zone on temperature and pressure were studied for establishing the optimal conditions of the RTC process.

It is shown, that the unlimited gas yield reaches upto almost 55 per cent in the raw materials, and their content in the RTC gases

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is approximating 70 per cent; the content of liquid unlimited components in the condensate is near 45 weight per cent. The total conversion depth during a single run equals almost 75 per cent. The radiation chemical yield comprises approximately 10^3 - 10^5 molecules per 100 ev depending on rate temperature and pressure. The RTC optimal conditions as to the yields and conversion depth for various raw materials range from 400 to 600°C at 1-3 atm depending on the dose rate.

The preliminary estimations show the economical efficiency of RTC in comparison with the pyrolisis in tube furnaces.